

IN THE CLAIMS

Please amend the claims as follows:

Claims 1-24 (Canceled).

Claim 25 (New): An interleaving method used in a transmitter for multiplexing a plurality of information data into multiplexed signals, interleaving the multiplexed signals by using an interleaver, and sending a frame signal including slots each of which includes the multiplexed signals that is interleaved, wherein the structure of said interleaver is a matrix with B rows and F columns, said interleaving method comprising the steps of:

writing said multiplexed signals into said matrix;

permuting signals in said matrix by permuting columns of said matrix on the basis of a predetermined rule; and

reading signals in said matrix,

said interleaving method characterized in that the number F of columns of said matrix is twice as many as the number of slots of said frame.

Claim 26 (New): An interleaving method used in a transmitter for multiplexing a plurality of information data into multiplexed signals, interleaving the multiplexed signals by using an interleaver, and sending a frame signal including slots each of which includes the multiplexed signals that is interleaved, wherein the structure of said interleaver is a matrix with B rows and F columns, said interleaving method comprising the steps of:

writing said multiplexed signals into said matrix;

permuting signals in said matrix by permuting columns of said matrix on the basis of a predetermined rule;

reading signals in said matrix; and

outputting said signals read from said matrix,  
said interleaving method characterized in that said slot includes a pilot signal, and the number F of columns of said matrix is 2N times as many as the number of slots of said frame, wherein N is a positive integer.

**Claim 27 (New):** The interleaving method as claimed in claim 25, characterized in that the step of permuting includes the step of permuting signals in said matrix by permuting only a part of columns of said matrix after permuting columns of said matrix on the basis of said predetermined rule.

**Claim 28 (New):** The interleaving method as claimed in claim 26, characterized in that the step of permuting includes the step of permuting signals in said matrix by permuting only a part of columns of said matrix after permuting columns of said matrix on the basis of said predetermined rule.

**Claim 29 (New):** The interleaving method as claimed in claim 26, characterized in that the step of outputting includes the step of:

distributing said signals in a slot at least among an end side part of the slot and the center part of the slot, and sending said signals.

**Claim 30 (New):** The interleaving method as claimed in claim 26, characterized in that the step of outputting includes the steps of:

placing signals read from said matrix in a first slot at the center part of the first slot, and placing signals read from said matrix in a second slot at an end side part of the second slot, and

sending slots in which signal placement of the first slot and signal placement of the second slot are alternately repeated.

**Claim 31 (New):** The interleaving method as claimed in claim 25, characterized in that the number F of columns of said matrix is 15 or 30.

**Claim 32 (New):** The interleaving method as claimed in claim 26, characterized in that the number F of columns of said matrix is 15 or 30.

**Claim 33 (New):** The interleaving method as claimed in claim 25, characterized in that the number F of columns of said matrix is 16 or 32.

**Claim 34 (New):** The interleaving method as claimed in claim 26, characterized in that the number F of columns of said matrix is 16 or 32.

**Claim 35 (New):** The interleaving method as claimed in claim 25, characterized in that the number of columns of said matrix is 30, and said predetermined rule is defined such that columns are permuted in an order indicated by a pattern C<sub>0</sub>, C<sub>20</sub>, C<sub>10</sub>, C<sub>5</sub>, C<sub>15</sub>, C<sub>25</sub>, C<sub>3</sub>, C<sub>13</sub>, C<sub>23</sub>, C<sub>8</sub>, C<sub>18</sub>, C<sub>28</sub>, C<sub>1</sub>, C<sub>11</sub>, C<sub>21</sub>, C<sub>6</sub>, C<sub>16</sub>, C<sub>26</sub>, C<sub>4</sub>, C<sub>14</sub>, C<sub>24</sub>, C<sub>19</sub>, C<sub>9</sub>, C<sub>29</sub>, C<sub>12</sub>, C<sub>2</sub>, C<sub>7</sub>, C<sub>22</sub>, C<sub>27</sub>, C<sub>17</sub>, wherein C<sub>i</sub> is the (i+1)th column of said matrix, for i=0 to 29.

**Claim 36 (New):** The interleaving method as claimed in claim 26, characterized in that the number of columns of said matrix is 30, and said predetermined rule is defined such that columns are permuted in an order indicated by a pattern C<sub>0</sub>, C<sub>20</sub>, C<sub>10</sub>, C<sub>5</sub>, C<sub>15</sub>, C<sub>25</sub>, C<sub>3</sub>,

C<sub>13</sub>, C<sub>23</sub>, C<sub>8</sub>, C<sub>18</sub>, C<sub>28</sub>, C<sub>1</sub>, C<sub>11</sub>, C<sub>21</sub>, C<sub>6</sub>, C<sub>16</sub>, C<sub>26</sub>, C<sub>4</sub>, C<sub>14</sub>, C<sub>24</sub>, C<sub>19</sub>, C<sub>9</sub>, C<sub>29</sub>, C<sub>12</sub>, C<sub>2</sub>, C<sub>7</sub>, C<sub>22</sub>, C<sub>27</sub>, C<sub>17</sub>, wherein C<sub>i</sub> is the (i+1)th column of said matrix, for i=0 to 29.

Claim 37 (New): A transmitter for transmitting information data by using a frame that includes a plurality of slots each of which includes information data, said transmitter comprises:

channel coding parts (52, 54) for coding said information data;

a channel multiplexing part (64) for multiplexing a plurality of coded signals;

an interleaver (66) for interleaving the multiplexed signals, wherein the structure of said interleaver is a matrix,

wherein bit positions of signals in said interleaver (66) are permuted by permuting columns of said interleaver,

said transmitter characterized in that the number of columns of said matrix is twice as many as the number of slots of an output data frame.

Claim 38 (New): A transmitter for transmitting information data by using a frame that includes a plurality of slots each of which includes information data, said transmitter comprises:

a coding part (11, 12, 13) for coding said information data;

an interleaver (14) for interleaving coded signals, wherein the structure of said interleaver is a matrix,

characterized in that said transmitter further comprises:

a slot multiplexing circuit (15) for inserting a pilot signal in each slot that includes interleaved signals, wherein said pilot signal indicates reference phase of modulation; and

a wireless circuit (16) for modulating signals output from said slot multiplexing circuit (15),

wherein the number of columns of said matrix of said interleaver (14) is  $2N$  times as many as the number of slots of an output data frame, wherein  $N$  is a positive integer, and wherein bit positions of signals in said matrix are permuted by permuting columns of said matrix.

**Claim 39 (New):** The transmitter as claimed in claim 37, characterized in that said interleaver (14, 66) permutes signals in said matrix by permuting only a part of columns of said matrix after permuting columns of said matrix.

**Claim 40 (New):** The transmitter as claimed in claim 38, characterized in that said interleaver (14, 66) permutes signals in said matrix by permuting only a part of columns of said matrix after permuting columns of said matrix.

**Claim 41 (New):** The transmitter as claimed in claim 38, characterized in that the slot multiplexing circuit (15) distributes said interleaved signals in a slot at least among an end side part of the slot and the center part of the slot.

**Claim 42 (New):** The transmitter as claimed in claim 38, characterized in that: the slot multiplexing circuit (15) places the pilot signal at each end of each slot, and wherein the slot multiplexing circuit (15) places interleaved signals in a first slot at the center part of the first slot, places interleaved signals in a second slot at an end side part of the second slot, and outputs slots in which signal placement of the first slot and signal placement of the second slot are alternately repeated.

Claim 43 (New): The transmitter as claimed in claim 37, characterized in that the number of columns of said interleaver (14, 66) is 15 or 30.

Claim 44 (New): The transmitter as claimed in claim 38, characterized in that the number of columns of said interleaver (14, 66) is 15 or 30.

Claim 45 (New): The transmitter as claimed in claim 37, characterized in that the number of columns of said interleaver (14, 66) is 16 or 32.

Claim 46 (New): The transmitter as claimed in claim 38, characterized in that the number of columns of said interleaver (14, 66) is 16 or 32.

Claim 47 (New): The transmitter as claimed in claim 37, characterized in that the number of columns of said interleaver is 30, and said columns are permuted in an order indicated by a pattern C<sub>0</sub>, C<sub>20</sub>, C<sub>10</sub>, C<sub>5</sub>, C<sub>15</sub>, C<sub>25</sub>, C<sub>3</sub>, C<sub>13</sub>, C<sub>23</sub>, C<sub>8</sub>, C<sub>18</sub>, C<sub>28</sub>, C<sub>1</sub>, C<sub>11</sub>, C<sub>21</sub>, C<sub>6</sub>, C<sub>16</sub>, C<sub>26</sub>, C<sub>4</sub>, C<sub>14</sub>, C<sub>24</sub>, C<sub>19</sub>, C<sub>9</sub>, C<sub>29</sub>, C<sub>12</sub>, C<sub>2</sub>, C<sub>7</sub>, C<sub>22</sub>, C<sub>27</sub>, C<sub>17</sub>, wherein C<sub>i</sub> is the (i+1)th column of said matrix, for i=0 to 29.

Claim 48 (New): The transmitter as claimed in claim 38, characterized in that the number of columns of said interleaver is 30, and said columns are permuted in an order indicated by a pattern C<sub>0</sub>, C<sub>20</sub>, C<sub>10</sub>, C<sub>5</sub>, C<sub>15</sub>, C<sub>25</sub>, C<sub>3</sub>, C<sub>13</sub>, C<sub>23</sub>, C<sub>8</sub>, C<sub>18</sub>, C<sub>28</sub>, C<sub>1</sub>, C<sub>11</sub>, C<sub>21</sub>, C<sub>6</sub>, C<sub>16</sub>, C<sub>26</sub>, C<sub>4</sub>, C<sub>14</sub>, C<sub>24</sub>, C<sub>19</sub>, C<sub>9</sub>, C<sub>29</sub>, C<sub>12</sub>, C<sub>2</sub>, C<sub>7</sub>, C<sub>22</sub>, C<sub>27</sub>, C<sub>17</sub>, wherein C<sub>i</sub> is the (i+1)th column of said matrix, for i=0 to 29.